STATUS OF THE CLAIMS

Claims 1-79 were originally filed in WO 0119975: the present application is the US national filing thereof.

Claims 1-8, 12-21, 26-35, 40-42, 44-47, 49-52, 54, 56, 58, 61, 66-75 have been amended.

Claims 9-11, 22-25, 36-39, 43, 48, 53, 59, 62-64, and 76-79 have been cancelled.

New claim 80 has been added.

Claims 1-8, 12-21, 26-35, 40-42, 44-47, 49-52, 54-58, 60-61, 65-75, and 80 are presented for consideration. A marked up copy of the claims as amended may be found in Appendix A. A clean copy of these claims may be found in Appendix B.

REMARKS

The claims have been amended to comply with US patent practice. No new matter has been added.

New claim 80 has been added. This claim has descriptive basis in original claim 75.

Applicants respectfully requests early action.

Respectfully submitted,

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Appendix A

(marked up claims as amended)

1. A ~~P~~potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 1.2 units following 4 freeze/thaw cycles of freezing at –70°C overnight and thawing at room temperature for at least 2 hours.

2. The ~~P~~potato starch according to claim 1, wherein the 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 1.0 units following 4 freeze/thaw cycles.

3. The ~~P~~potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.9 units following 3 freeze/thaw cycles of freezing at –70°C overnight and thawing at room temperature for at least two hours.

4. The ~~P~~potato starch according to claim 3, wherein the~~a~~ 1% w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.7 units following 3 freeze/thaw cycles.

5. The ~~P~~potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.7 units following 2 freeze/thaw cycles of freezing at –70°C overnight and thawing at room temperature for at least two hours.

6. The ~~P~~potato starch according to claim 5, wherein the ~~a~~ 1% w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.5 units following 2 freeze/thaw cycles.

7. The ~~P~~potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.5 units following 1 freeze/thaw cycle of freezing at –70°C overnight and thawing at room temperature for at least 2 hours.

8. The ~~P~~potato starch according to claim 7, wherein a 1% w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.3 units following 1 freeze/thaw cycle.

~~9. Starch in accordance with claim 1 or 2, being further in accordance with claim 3 or 4.~~

~~10. Starch in accordance with claim 9, being further in accordance with claim 5 or 6.~~

~~11. Starch in accordance with claim 10, being further in accordance with claim 7 or 8.~~

12. A ~~P~~potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 40% syneresis following 4 freeze/thaw cycles of freezing at -70°C overnight and thawing at 22°C for 60 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

13. The ~~P~~potato starch according to claim 12, which exhibits less than 30% syneresis following 4 freeze/thaw cycles.

14. The ~~P~~potato starch according to claim 12, which exhibits less than 20% syneresis following 4 freeze/thaw cycles.

15. The Ppotato starch according to claim 12, which exhibits less than 10% syneresis following 4 freeze/thaw cycles.

16. The Ppotato starch of claim 12 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 30% syneresis following 3 freeze/thaw cycles of freezing at –70°C overnight and thawing at 22°C for 60 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

17. The Ppotato starch according to claim 16, which exhibits less than 20% syneresis following 3 freeze/thaw cycles.

18. The Ppotato starch according to claim 16, which exhibits less than 10% syneresis following 3 freeze/thaw cycles.

19. The Ppotato starch of claim 12 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 30% syneresis following 2 freeze/thaw cycles of freezing at –70°C overnight and thawing at 22°C for 60 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

20. The Ppotato starch according to claim 19, which exhibits less than 20% syneresis following 2 freeze/thaw cycles.

21. The Ppotato starch according to claim 19, which exhibits less than 10% syneresis following 2 freeze/thaw cycles.

~~22. Potato starch according to claim 12 and being further in accordance with claim 16 and claim 19.~~

~~23. Potato starch according to claim 13, and being further in accordance with claim 17 and claim 20.~~

~~24. Potato starch in accordance with claim 14, and being further in accordance with claim 18 and claim 21.~~

~~25. Potato starch in accordance with claims 15, 18 and 21.~~

26. A ~~P~~potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 40% syneresis following 4 freeze/thaw cycles of freezing at –70°C for 1 hour and thawing at 22°C for 10 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

27. The ~~P~~potato starch according to claim 26, which exhibits less than 30% syneresis following 4 freeze/thaw cycles.

28. The ~~P~~potato starch according to claim 26, which exhibits less than 20% syneresis following 4 freeze/thaw cycles.

29. The ~~P~~potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 40% syneresis following 3 freeze/thaw cycles of freezing at –70°C for 1 hour and thawing at 22°C for 10 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

30. The ~~P~~potato starch according to claim 29, which exhibits less than 30% syneresis following 3 freeze/thaw cycles.

31. The ~~P~~potato starch according to claim 29, which exhibits less than 20% syneresis following 3 freeze/thaw cycles.

32. The ~~P~~potato starch according to claim 29, which exhibits less than 10% syneresis following 3 freeze/thaw cycles.

33. The ~~P~~potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 30% syneresis following 2 freeze/thaw cycles of freezing at –70°C for 1 hour and thawing at 22°C for 10 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

34. The ~~P~~potato starch according to claim 33, which exhibits less than 20% syneresis following 2 freeze/thaw cycles.

35. The ~~P~~potato starch according to claim 33, which exhibits less than 10% syneresis following 2 freeze/thaw cycles.

~~36. Potato starch according to claim 26, being further in accordance with claim 30 and claim 34.~~

~~37. Potato starch according to claim 27, being further in accordance with claim 31 and claim 35.~~

~~38. Potato starch according to any one of claims 1-11, and being further in accordance with any one of claims 12-25 or any one of claims 26-37.~~

~~39. Potato starch according to any one of claims 1-11, and being further in accordance with any one of claims 12-25 and any one of claims 26-37.~~

40. A ~~P~~potato starch which, when in native form extracted from a potato plant, has an apparent amylose content of less than 8% as determined by the method

of Morrison & Laignelet (1983 Cereal Science 1, 9-20) and a ratio of fraction I to fraction II short chain glucans of at least 60%.

41. The ~~P~~potato starch according to claim 40, having a fraction I to fraction II ratio of at least 65%.

42. The ~~P~~potato starch according to claim 40, having a fraction I to fraction II ratio of at least 70%.

~~43. Potato starch according to any one of claims 40-42, being further in accordance with claim 38 or 39.~~

44. A ~~P~~potato starch which, when in native form extracted from a potato plant, has an apparent amylose content of less than 8%, as determined by the method of Morrison & Laignelet (1983 Cereal Science 1, 9-20), and a viscosity onset temperature of less than 67°C as determined by viscometric analysis of a 7.4% (w/v) aqueous suspension of the starch using a Rapid Visco Amylograph, Newport Scientific Series 4 instrument operating on the standard 1 heating and stirring protocol.

45. The ~~S~~starch according to claim 44, having a viscosity onset temperature of less than 65°C.

46. The ~~S~~starch according to claim 44, having a viscosity onset temperature of less than 55°C.

47. The ~~S~~starch according to claim 44, having a viscosity onset temperature of less than 51°C.

~~48. Starch according to any one of claims 44-47, being further in accordance with any one of claims 1-43.~~

49. A ~~P~~potato starch which, when in native form extracted from a potato plant, has an apparent amylose content of less than 8% as determined by the method of Morrison & Laignelet (1983) and, when analysed by differential scanning calorimetry using a Perkin Elmer DSC7 instrument a 10mg starch sample in aqueous mix of less than 25% starch w/v exhibits a gelatinisation onset temperature of less than 67°C.

50. The ~~P~~potato starch according to claim 49, which exhibits a gelatinisation onset temperature of less than 66°C.

51. The ~~P~~potato starch according to claim 49, which exhibits a gelatinisation onset temperature of less than 51°C.

52. The ~~P~~potato starch according to claim 49, which exhibits a gelatinisation onset temperature of less than 50°C.

~~53. Potato starch according to any one of claims 49-52, and being further in accordance with any one of claims 1-48.~~

54. The ~~S~~starch of claim 1~~according to any one of the preceding claims~~, wherein the starch granules are substantially free of cracks.

55. A plant cell comprising introduced nucleic acid sequences, which sequences specifically inhibit the expression of granule bound starch synthase I (GBSSI) and at least one further starch synthase enzyme involved in starch synthesis in the plant cell.

56. The~~A~~ plant cell according to claim 55, wherein the said at least one further starch synthase enzyme specifically inhibited by the introduced nucleic acid sequences comprises starch synthase II and/or starch synthase III.

57. A plant cell comprising introduced nucleic acid sequences, which sequences specifically inhibit the expression of three or more enzymes involved in starch synthesis in the cell.

58. The ~~A~~ plant cell according to ~~any one of~~ claim~~s~~ 55~~-57~~ which synthesises freeze/thaw stable starch as a result of the introduction of the nucleic acid sequences.

~~59. A potato plant cell according to any one of claims 55-58.~~

60. A plant comprising introduced nucleic acid sequences, or the progeny of such a plant, wherein the introduced nucleic acid sequences specifically inhibit the expression of GBSSI and at least one further starch synthase enzyme involved in starch synthesis in the plant.

61. The~~A~~ plant according to claim 60, in which the introduced nucleic acid sequences specifically inhibit GBSSI, and one or both of SSII and SSIII.

~~62. A plant according to claim 60 or 61, produced from a plant cell according to any one of claims 55-59.~~

~~63. A potato plant according to any one of claims 60-62.~~

~~64. A potato plant according to claim 63, which gives rise to starch according to any one of claims 1-54.~~

65. A method of altering the starch content of a plant, the method comprising the steps of; providing nucleic acid sequences; and introducing said sequences into the plant, wherein the sequences specifically inhibit the expression of GBSSI and at least one further enzyme involved in starch synthesis in the plant.

66. The ~~A~~ method according to claim 65, wherein the sequences are introduced into a plant cell, and the plant cell is grown into a plantlet and subsequently into a plant.

67. The~~A~~ method according to claim 65~~ or 66~~, wherein the sequences are introduced into a potato plant or plant cell.

68. The~~A~~ method according to ~~any one of~~ claim~~s~~ 65~~, 66 or 67~~, wherein the introduced sequences specifically inhibit the expression of GBSSI and one or both of SSII and SSIII.

69. ~~A~~ The method ~~according to any one~~ of claim~~s~~ 65~~-68~~, wherein the introduced nucleic acid sequences are operably linked in the antisense orientation to a promoter active in the plant, so as to cause transcription of the sequences.

70. A plant produced by the method of ~~any one of~~ claim~~s~~ 65~~-69~~.

71. Starch obtained from a plant altered by the method of ~~any one of~~ claim~~s~~ 65~~-69~~.

72 A method of making starch, the method comprising the steps of: altering the starch content of a plant by the method of ~~any one of~~ claim~~s~~ 65~~-69~~; and extracting the altered starch content from the plant.

73. The~~A~~ method according to claim 72, further comprising the step of modifying the extracted starch by physical, and/or enzymatic and/or chemical processing *in vitro*.

74. A ~~P~~potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability.

75. A composition comprising ~~Use of~~ the starch ~~according to any one~~ of claim~~s~~ 1~~-54 or claim 74 in the preparation of:~~, wherein the composition is selected from the group consisting of a thickener composition~~s~~; a packaging material; an adhesive~~s~~; a paper; a coating~~s~~; and a~~or~~ personal care product~~s~~.

~~76. Potato starch substantially as hereinbefore described and with reference to the accompanying drawings.~~

~~77. A plant cell substantially as hereinbefore described.~~

~~78. A plant substantially as hereinbefore described.~~

~~79. A method of altering the starch content of a plant substantially as hereinbefore described.~~

80. A composition comprising the starch of claim 74, wherein the composition is selected from the group consisting of a thickener composition; a packaging material; an adhesive; a paper; a coating; and a personal care product.

Appendix B
(claims as pending)

1. A potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 1.2 units following 4 freeze/thaw cycles of freezing at –70°C overnight and thawing at room temperature for at least 2 hours.

2. The potato starch according to claim 1, wherein the 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 1.0 units following 4 freeze/thaw cycles.

3. The potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.9 units following 3 freeze/thaw cycles of freezing at –70°C overnight and thawing at room temperature for at least two hours.

4. The potato starch according to claim 3, wherein the 1% w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.7 units following 3 freeze/thaw cycles.

5. The potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.7 units following 2 freeze/thaw cycles of freezing at –70°C overnight and thawing at room temperature for at least two hours.

6. The potato starch according to claim 5, wherein the 1% w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.5 units following 2 freeze/thaw cycles.

7. The potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability such that a 1%w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.5 units following 1 freeze/thaw cycle of freezing at –70°C overnight and thawing at room temperature for at least 2 hours.

8. The potato starch according to claim 7, wherein a 1% w/v aqueous suspension of the starch has an absorbance at 700nm wavelength of less than 0.3 units following 1 freeze/thaw cycle.

12. A potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 40% syneresis following 4 freeze/thaw cycles of freezing at -70°C overnight and thawing at 22°C for 60 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

13. The potato starch according to claim 12, which exhibits less than 30% syneresis following 4 freeze/thaw cycles.

14. The potato starch according to claim 12, which exhibits less than 20% syneresis following 4 freeze/thaw cycles.

15. The potato starch according to claim 12, which exhibits less than 10% syneresis following 4 freeze/thaw cycles.

16. The potato starch of claim 12 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of

the starch exhibits less than 30% syneresis following 3 freeze/thaw cycles of freezing at –70°C overnight and thawing at 22°C for 60 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

17. The potato starch according to claim 16, which exhibits less than 20% syneresis following 3 freeze/thaw cycles.

18. The potato starch according to claim 16, which exhibits less than 10% syneresis following 3 freeze/thaw cycles.

19. The potato starch of claim 12 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 30% syneresis following 2 freeze/thaw cycles of freezing at –70°C overnight and thawing at 22°C for 60 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

20. The potato starch according to claim 19, which exhibits less than 20% syneresis following 2 freeze/thaw cycles.

21. The potato starch according to claim 19, which exhibits less than 10% syneresis following 2 freeze/thaw cycles.

26. A potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 40% syneresis following 4 freeze/thaw cycles of freezing at –70°C for 1 hour and thawing at 22°C for 10 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

27. The potato starch according to claim 26, which exhibits less than 30% syneresis following 4 freeze/thaw cycles.

28. The potato starch according to claim 26, which exhibits less than 20% syneresis following 4 freeze/thaw cycles.

29. The potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 40% syneresis following 3 freeze/thaw cycles of freezing at –70°C for 1 hour and thawing at 22°C for 10 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

30. The potato starch according to claim 29, which exhibits less than 30% syneresis following 3 freeze/thaw cycles.

31. The potato starch according to claim 29, which exhibits less than 20% syneresis following 3 freeze/thaw cycles.

32. The potato starch according to claim 29, which exhibits less than 10% syneresis following 3 freeze/thaw cycles.

33. The potato starch of claim 1 which, when in native form extracted from a potato plant, exhibits freeze-thaw stability, such that a 5% w/v aqueous paste of the starch exhibits less than 30% syneresis following 2 freeze/thaw cycles of freezing at –70°C for 1 hour and thawing at 22°C for 10 minutes, and then spinning at 8,000g for 10 minutes at 18°C.

34. The potato starch according to claim 33, which exhibits less than 20% syneresis following 2 freeze/thaw cycles.

35. The potato starch according to claim 33, which exhibits less than 10% syneresis following 2 freeze/thaw cycles.

40. A potato starch which, when in native form extracted from a potato plant, has an apparent amylose content of less than 8% as determined by the method of Morrison & Laignelet (1983 Cereal Science 1, 9-20) and a ratio of fraction I to fraction II short chain glucans of at least 60%.

41. The potato starch according to claim 40, having a fraction I to fraction II ratio of at least 65%.

42. The potato starch according to claim 40, having a fraction I to fraction II ratio of at least 70%.

44. A potato starch which, when in native form extracted from a potato plant, has an apparent amylose content of less than 8%, as determined by the method of Morrison & Laignelet (1983 Cereal Science 1, 9-20), and a viscosity onset temperature of less than 67°C as determined by viscometric analysis of a 7.4% (w/v) aqueous suspension of the starch using a Rapid Visco Amylograph, Newport Scientific Series 4 instrument operating on the standard 1 heating and stirring protocol.

45. The starch according to claim 44, having a viscosity onset temperature of less than 65°C.

46. The starch according to claim 44, having a viscosity onset temperature of less than 55°C.

47. The starch according to claim 44, having a viscosity onset temperature of less than 51°C.

49. A potato starch which, when in native form extracted from a potato plant, has an apparent amylose content of less than 8% as determined by the method of Morrison & Laignelet (1983) and, when analysed by differential scanning calorimetry using a Perkin Elmer DSC7 instrument a 10mg starch sample in aqueous mix of less than 25% starch w/v exhibits a gelatinisation onset temperature of less than 67°C.

50. The potato starch according to claim 49, which exhibits a gelatinisation onset temperature of less than 66°C.

51. The potato starch according to claim 49, which exhibits a gelatinisation onset temperature of less than 51°C.

52. The potato starch according to claim 49, which exhibits a gelatinisation onset temperature of less than 50°C.

54. The starch of claim 1, wherein the starch granules are substantially free of cracks.

55. A plant cell comprising introduced nucleic acid sequences, which sequences specifically inhibit the expression of granule bound starch synthase I (GBSSI) and at least one further starch synthase enzyme involved in starch synthesis in the plant cell.

56. The plant cell according to claim 55, wherein the said at least one further starch synthase enzyme specifically inhibited by the introduced nucleic acid sequences comprises starch synthase II and/or starch synthase III.

57. A plant cell comprising introduced nucleic acid sequences, which sequences specifically inhibit the expression of three or more enzymes involved in starch synthesis in the cell.

58. The plant cell according to claim 55 which synthesises freeze/thaw stable starch as a result of the introduction of the nucleic acid sequences.

60. A plant comprising introduced nucleic acid sequences, or the progeny of such a plant, wherein the introduced nucleic acid sequences specifically inhibit the expression of GBSSI and at least one further starch synthase enzyme involved in starch synthesis in the plant.

61. The plant according to claim 60, in which the introduced nucleic acid sequences specifically inhibit GBSSI, and one or both of SSII and SSIII.

65. A method of altering the starch content of a plant, the method comprising the steps of; providing nucleic acid sequences; and introducing said sequences into the plant, wherein the sequences specifically inhibit the expression of GBSSI and at least one further enzyme involved in starch synthesis in the plant.

66. The method according to claim 65, wherein the sequences are introduced into a plant cell, and the plant cell is grown into a plantlet and subsequently into a plant.

67. The method according to claim 65, wherein the sequences are introduced into a potato plant or plant cell.

68. The method according to claim 65, wherein the introduced sequences specifically inhibit the expression of GBSSI and one or both of SSII and SSIII.

69. The method of claim 65, wherein the introduced nucleic acid sequences are operably linked in the antisense orientation to a promoter active in the plant, so as to cause transcription of the sequences.

70. A plant produced by the method of claim 65.

71. Starch obtained from a plant altered by the method of claim 65.

72 A method of making starch, the method comprising the steps of: altering the starch content of a plant by the method of claim 65; and extracting the altered starch content from the plant.

73. The method according to claim 72, further comprising the step of modifying the extracted starch by physical, and/or enzymatic and/or chemical processing *in vitro*.

74. A potato starch which, when in native form extracted from a potato plant, exhibits freeze-thaw stability.

75. A composition comprising the starch of claim 1, wherein the composition is selected from the group consisting of a thickener composition; a packaging material; an adhesive; a paper; a coating; and a personal care product.

80. A composition comprising the starch of claim 74, wherein the composition is selected from the group consisting of a thickener composition; a packaging material; an adhesive; a paper; a coating; and a personal care product.